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THE AIR EXPRESS SERVICE IN THE
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BY

WAYNE LINTON McMILLEN

B.S., University of Illinois, 1932

M.S., University of Illinois, 1933

AN ABSTRACT OF A THESIS

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN
ECONOMICS IN THE GRADUATE SCHOOL OF
THE UNIVERSITY OF ILLINOIS, 1935

URBANA, ILLINOIS
1935

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ACKNOWLEDGMENT

The writer would be inexcusably remiss if he did not acknowledge his especial indebtedness to Professor H. M. Gray, under whose supervision this thesis was written. Acknowledgment is also made of his debt to Professor D. P. Locklin of the University of Illinois and Professor F. D. Fagg, Jr., of the Air Law Institute of Northwestern University for the interest they have taken in this study.

The writer is also grateful to Mr. W. A. M. Burden of Scudder, Stevens, and Clark who was so kind as to make his study on the subject available, to his brother Frank who helped in the computation for a number of the tables, and to many others who have helped in one way or another.

THE AIR EXPRESS SERVICE IN THE UNITED STATES

The purpose of this study is to arrive at some conclusions as to what policies can and should be followed in developing the air express service so as to render air transportation less dependent upon subsidy for its existence and to make this new and fast service available for a greater quantity and number of commodities, and to a larger portion of the public.

The scope of this study includes only the air express portion of the air transportation industry. Of the air express business it includes only the domestic air express service, omitting any thorough consideration of foreign air express service, either that operated under a foreign flag or that operated under the American flag, such as that of the Pan American Airways. Of this domestic air express service only the economic aspects are considered.

Of course there are certain other closely related questions which cannot be completely ignored. The problems of air express are so very closely inter-related with those of the passenger and air mail service that some consideration and frequent reference must be made to these services. At the present time, passengers, mail, and express are all hauled on the same planes using the same equipment and personnel, and sharing in the expenses. Only because passenger and mail traffic exists to absorb a large portion, at least of the fixed costs, can air express exist, economically. Rates on all three of the services must be constructed in consideration of each type of traffic so as to utilize the equipment as fully as possible.

The question of subsidy to the airlines, through the air mail pay or otherwise, has an important bearing on the air express service. The service, as we know it, could not exist without, at least certain types of subsidy.

In this study an analysis has been made of the present air express traffic in order to show its present place in the transportation of high-value merchandise. The first part of this analysis ascertains the nature of the traffic in such respects as the size of shipments, the relative importance of various items from the standpoint of number of shipments, weight of, and revenue derived. The second part ascertains the characteristics

of traffic movement such as the direction of movement, the relative importance of various sections of the country in producing the traffic and the time of movement. Another section of the study makes a more or less elaborate comparison of air express, rail express, air mail, and parcel post rates on representative routes ranging from a rather short one to a very long transcontinental haul. In the same section the time required by the various agencies for the transportation of commodities shows the savings in time effected by the air service. These comparisons demonstrate the difficult problem facing the airline in competing with surface agencies under the present air express rate structure, and how insignificant the air express traffic must remain if present rates persist.

Next the question of costs is considered. The cost of the air express service is computed under various conditions such as (a) when air express traffic is hauled in modern passenger equipment along with mail and passengers, (b) when it is carried on exclusive air express schedules using modern passenger equipment stripped for the purpose, (c) when probable future and larger passenger equipment is used, and the express is carried along with mail and passengers, (d) when specially designed cargo planes are used for exclusive express schedules, and (e) when obsolete passenger equipment is stripped and used for exclusive express schedules.

The purpose of this study of costs is to establish a lower limit under which the level of air express rates should never go if the service is economically justified.

A study of the demand for the service under various conditions is made in an effort to determine whether, at the rates dictated by the cost as a lower limit, there would be sufficient traffic available to justify an attempt to develop the service to any great extent. Inasmuch as several surveys of the probable demand for the service already have been made on a national scale, the results of these surveys are presented in this section of the study.

Lastly, certain policies which seem necessary or desirable in developing a greater volume of traffic and revenue from the air express service are proposed. The proposed policies are based mainly on the facts brought out in the sections of the study discussed above.

There has been no comprehensive study of the air express service published. For this reason, the greater part of the data were gathered from original company and government records, papers, and documents. Access was obtained to an unpublished study of air express by Mr. W. A. M. Burden of Scudder, Stevens, and Clark of New York City (Investment Counsel) and another unpublished study made by Mr. John F. Scheetz of the McCann-Erickson Advertising Agency, for the United Air Lines.

Many data were gathered by personal interviews in Chicago, Washington, D. C., and New York City, with airline and government executives, as well as many letters and communications from these sources. A few Government publications yielded much data, as did records consulted in the offices of the Interstate Commerce Commission, and the Post Office Department in Washington.

Present air express traffic is relatively insignificant, but shows promise of considerable growth. Most of the traffic is handled by the two air express systems; the General Air Express system, an interline association, and the Air Express Division of the Railway Express Agency.

About three-fourths of all air express shipments are five pounds or less, while the average weight is about six and one-half pounds. The average revenue per shipment is slightly under three dollars. The seven most important items carried comprise four-fifths the total number of shipments, three-fourths the weight, and about two-thirds of the revenue.

The heavier shipments (those above ten pounds) comprise a small proportion of the total shipments yet a relatively large percentage of the tonnage and revenues. Hence this traffic in heavier items is very desirable and its volume should be increased as much as possible.

Most air express moves at night. More than 80 per cent of all air express traffic moves on the late afternoon and night schedules. There is no great seasonal variation in the traffic.

Air express rates are from 1.8 to 8 times rail express rates depending upon the weight and distance. The ratio of the air express rate to the rail rate increases directly with both weight and distance. The average air express shipment, weighing $6\frac{1}{2}$

rounds and going 1000 miles, travels at a rate of about four times the railway express rate. The fact that the differential between air and rail rates is so much greater for the heavier shipments, it seems, explains, in part, the great preponderance of very light shipments in air express traffic.

On the shorter hauls the time advantage of air express is not so great. While on the longer hauls the rail time is more than five times the air time, on the shorter ones it is about three times. Also because most air express requires no faster service than overnight delivery, the relative importance of air express service decreases with the shorter distances. Because of the very high present air express rates, air express will seldom be used except where time is a much more important consideration than cost of transportation. Unlike any other mode of transporting merchandise there is no range of weight or distance where air transportation is cheaper than all other agencies. Present high rates impose two limitations on the service. The service is limited to (a) a very few kinds of articles, and (b) certain unusual conditions under which other commodities are shipped.

It seems that rates must be drastically reduced before the volume of air express traffic can become very important to the airlines.

At any given time costs vary with the proficiency of the management, with the terrain, and with the type of weather conditions found in various parts of the country. Over any given route costs vary with the season, generally being higher in the winter months. The major factors which affect costs at any given time over any given route are (1) the type of equipment used, and (2) the number of schedules flown; the first factor influencing principally the "flying" costs and the second the "ground" costs per trip. Inasmuch as the ground costs are relatively fixed costs, added schedules, up to a certain point, increase ground expenses very little, if any. Because this is true, the business is one of decreasing costs.

Although some growth may be expected at present rates, yet if the air express traffic grows to any significant volume it cannot be expected to bear its full share of all costs, including the overhead costs, but of course the revenue should cover all

of the out-of-pocket costs of handling the traffic plus some extra to apply on the overhead costs.

When express is carried on the passenger ships along with passengers and mail there is little out-of-pocket cost of handling and hauling it. Probably the most economical way of handling a very much greater quantity of traffic would be through the use of passenger planes with much greater cargo carrying capacity than those now in service. Since this would add little to the cost of transportation the great portion of the revenue from this traffic may be considered as net. This may be used for decreasing the net loss, or for enabling the lines to operate with less mail subsidy. In this event, of course, the express would be hauled on the regular passenger and mail schedules.

If exclusive air express schedules are to be flown the evidence presented in this study indicates that it is most economical to use specially designed cargo planes.¹ Where the addition of this equipment is impractical it seems that it is to the advantage of the airline to use the present modern transport equipment stripped for use as cargo ships rather than to use the obsolescent passenger equipment, even though there are no depreciation charges on this latter type of planes. It seems that contrary to popular opinion, the airline cannot afford to use obsolescent passenger equipment for flying exclusive air express schedules except for purely experimental purposes.

Any estimate of the probable volume of traffic under conditions existing neither in the past nor at the present time can be little more than an intelligent guess, and must be accepted with much caution. It seems to be tendency of prospective users to overestimate the volume of traffic which they would ship under various conditions.

The market for air express may be divided into that for "emergency" shipments and that for "regular" shipments. The former consists of a demand for high speed transportation due to unusual conditions arising in the affairs of the shipper or consignee while the latter implies a routine use of the service. On the whole, high rates do not act so much as a deterrent in the use of the service, for emergency purposes, as evidenced by

¹Such as the Fairchild XC31 cargo plane.

the fact that about three-fourths of the present traffic is of the emergency type and that traffic has grown very rapidly despite the very high prevailing rates. On the other hand there is reason to believe that a drastic reduction of rates would increase the volume of *regular* traffic very greatly.

The present transcontinental air express rate is about eight times the rail express rate. It has been estimated that a decrease in this rate to about four times the rail rate would increase the volume about one hundred per cent, while a decrease to three times the rail rate would increase the volume 500 per cent. It has also been estimated that at an average rate of 30 cents per ton mile the volume of air express traffic would be nearly 9,000,000 ton miles annually or nearly 20 times the present volume. These estimates seem to be conservative.

A PROPOSED POLICY FOR THE DEVELOPMENT OF THE AIR EXPRESS SERVICE IN THE UNITED STATES

1. Organization

The air express traffic of all of the American air lines should be handled *under one system*. It is recommended that this be done either: (a) by the formation of a new corporation jointly owned and controlled by the airlines, possibly using the pickup and delivery service of the Railway Express Agency, or the Telegraph Companies, or both, in cities where the traffic will not support a separate organization for the purpose, or

(b) by all air lines joining the Air Express Division of the Railway Express Agency in providing the service. The lines would have a contract with the Railway Express Agency, whereby the latter is to provide the pickup, delivery and ground handling services in the most efficient manner, and to receive as compensation the out-of-pocket costs of these services plus a percentage of the revenue remaining after this deduction for overhead costs and profit. Inasmuch as there is the potential danger of a conflict in the interests of the railroads and the airlines it is recommended that control of the air express rates be placed with the Interstate Commerce Commission, if the Railway Express Agency is to handle the air express traffic of all lines.

Regardless of the method used, the urgent and immediate

need is that one system should handle all air express traffic.

2. Rates.

It is recommended that to expand the service air express rates be drastically reduced. However, in view of the lack of a definite governmental policy toward air transportation, the airlines hesitate to add to their capital investment, which is necessary if the express rates are lowered. It seems they are some what justified in postponing expansion of the service. The lowered rates when the time comes for expansion, should be classified according to the type of commodities hauled. The proposed classification provides for:

(a) A "*Special*" Class for the items making up the bulk of present traffic, to pay approximately the present rates, and to be carried on passenger planes.²

(b) *First Class* items including in large part industrial products moving away from industrial centers and all products not specified in the other classes. This class of items is to pay a rate of from 2½ to 3 times the rail express rate (or between ½ and 1/3 of the "*Special*" Class items).

(c) *Second Class* items including perishables moving mainly toward major centers, paying a rate of about 65 per cent of that of *First Class* items.

(d) Specially low *commodity rates* in case there is a shortage of traffic moving toward the major centers. These rates are to apply to certain specific items that cannot bear the second class rates and it is suggested that they be about 50 per cent of the *First Class* rates.

Inasmuch as the present rate on the bulk of present traffic would not be disturbed, the revenue would be decreased very little, and with the almost certain large increase in volume and revenue under the classified rates, the net revenue to the airlines should be increased considerably. It is not assumed that adjustments in the proposed rates would not be necessary from time to time.

3. Competition.

²Among the items to be placed in this class:

(a) valuable papers, (b) advertising and printed matter, (c) news photos, (d) films, (e) bullion, (f) securities, (g) jewels, and (h) other valuables.

It has been urged that all express traffic should be handled by one system. It is proposed that air express rates should be regulated by the Interstate Commerce Commission to prevent the breaking down of the proposed classification by any competition for the air express traffic which later may arise from a possible inauguration of another express system. Regulation of rates was shown to be especially desirable if the traffic is to be handled by the Railway Express Agency. It is proposed that competition between airlines be regulated by some such agency as the Interstate Commerce Commission. Certificates of convenience and necessity should be required of any airline using the Government airways. Not more than one should be granted a certificate on any route unless the new applicant shows that its service is desirable and justified before it received a certificate. It seems that the very real and keen competition with the surface agencies of transportation can be relied upon to give the public the benefit of the advantages of competition and alert management. This control of airline competition would prevent the division, among several lines, of traffic which will hardly support one line.

4. *Exclusive Express Schedules.*

Perhaps the least expensive way of handling an expanded air express traffic is through the use of larger passenger planes with larger cargo carrying capacity, carrying express along with passengers and mail. However, if exclusive express schedules are flown, because larger passenger planes are not available, the specially designed cargo plane is likely to be less expensive than the use of any type of passenger equipment. Use of the obsolescent passenger plane is the least desirable and it is recommended that it be used only for purely experimental purposes.

5. *Educational Publicity.*

When it has been decided to expand the air express service much attention must be given to publicity, advertising, and other sales effort, for the general public is very poorly informed concerning the service.

The publicity and sales effort should be directed primarily toward the consignee, for as a rule he pays the charges and directs the shipper as to how the shipment is to be shipped. The

effort should be then to educate the very large number of consignees rather than a few large shippers.

All media should be employed such as (a) news columns of the papers, (b) the advertising of users of air express, (c) airline advertising, and (d) by direct sales effort.

6. *Subsidy.*

Although in this thesis no thorough study was made of the question of subsidy, yet the evidence presented by those who have studied the subject³ seems to show that for the proper development of the air transportation industry as a whole a subsidy is desirable for some years to come.

It is recommended that provision of the airways by the Federal Government, and the airports by municipalities should continue indefinitely, and that the payments for the transportation of air mail of a sum greater than postal receipts therefrom (or a direct federal subsidy) should continue until such time as the Interstate Commerce Commission decides that the business is able to stand on its own feet.

Because one of the greatest defects of the service is its lack of dependability due mainly to inability to fly in bad weather conditions, it is urged that the Federal Government push as rapidly as possible the installation of blind landing devices on all the federal airways. This is desirable from the standpoint of the passenger and mail traffic as well as that of the air express. It is felt that the use of these devices will enable the air service to approach the regularity and dependability of railroad transportation.

³Dr. Crane, the Federal Aviation Commission, and the Interstate Commerce Commission.

VITA

Wayne Linton McMillen was born at DeLand, Illinois, on January 17, 1907. He attended the public schools of DeLand. In the fall of 1924 he entered Illinois Wesleyan University at Bloomington and attended this institution for two years. During the school year 1926-1927 he taught in a rural school near DeLand. The following year he was Division Sales Supervisor for the Aluminum Cooking Utensil Company, of New Kensington, Pennsylvania. In the fall of 1928 he entered the University of Illinois. After this year he again acted in the capacity of Sales Supervisor for the Aluminum Company for another year, re-entering the University of Illinois in February 1931, and graduating with High Honors in February 1932. In the fall of 1932 he entered the Graduate School of the University of Illinois as a Scholar in the Economics of Public Utilities, and received the degree of Master of Science in 1933. During the following two years he has been a Fellow in the Economics of Public Utilities and has devoted the latter year to the preparation of this thesis.

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